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EROSION LOWERS WARTIME PRODUCTION on Northeastern farms

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The Farm and the War

To win the war, the "battle front" is dependent on the "home front" to furnish food, clothing, shelter, armament, ammunition, and other equipment. Agriculture and industry provide the armed forces with the necessary supplies.

The farm and the factory are closely related. The land has always furnished much of the raw material for industry. The demand for organic products has been gradually increasing over a long period. Farm products have been the sources of substitutes for diminishing metals and other mineral products even in peacetime. The war has increased many times the demand for substitute products. The war has also cut off completely the supply of certain raw materials which were formerly imported from foreign countries now under the control of the Axis. Some of the imports, like rubber, came largely from forests rather than from cultivated land. But the forests of North America do not yield such commodities. The farms of the United States are now called upon to furnish not only an increased quantity of food, but an enormous supply of organic products for mineral substitutes, as well as the organic materials which were formerly imported. This is an unprecedented task, in the face of labor and machinery shortages.

To meet these increased demands, it has become necessary for the country to set up production goals. Of all the stable farm products, wheat at this time is the only one the production of which need not be increased. In 1942, all production records were broken, especially in the case of strategic crops. Throughout the duration of the war, and probably for a considerable time afterward, farmers will be asked to grow these far in excess of normal times. Some of the more important strategic crops are: peanuts, dried field beans and peas, cover-crop seed, soybeans, and tomatoes and vegetables for canning.

Soil erosion is one of the worst obstacles to meeting these goals. It can be controlled only by proper conservation practices. Statements by farmers, as well as experimental data, indicate that if erosion were controlled and soil-building practices were used on all farm land, the crop yields would more than meet the proposed goals for most of the necessary farm products, without increasing the acreages of these crops. Contour-planted potatoes in Maine produced an increase of 50 barrels of potatoes per acre, or 37 percent. A New York farmer stated, "The first year I started strip cropping I grew one-third more corn silage on 2 acres less land." A West Virginia farmer says, "My per-acre yield of tomatoes has increased 30 percent as a result of the use of strip cropping." At Marlboro, N. J., plots with soil-building practices produced 35 percent more sweet corn and lost only 54 pounds of soil per acre as against 2,400 pounds per acre on the same kind of land which was not treated.

Gullies and Deposition

Gullies and fresh deposits are clearly visible, but sheet erosion is not so easily recognized.

If one or more of the conditions described and

illustrated on the following pages exists on your farm, you may be sure soil erosion is at work.



Gullies near Kanona, N. Y., formed by one rain storm in 1935.

Gullies and deposition near Bath, N. Y., the result of one rain storm in 1935.



An Abundance of Stones and Gravel on the Surface of the Soil

Farmers often pick up the stones and cart them away, and in a few years they are as plentiful as ever.

This led to the old belief that stones grow.

Stones are sometimes brought to the surface through "heaving" (freezing and thawing).

This happens most often on poorly drained soils. Heaving does not occur on well-drained soils except when they are saturated with water.

The most common cause of a stony field is the fact that the fine soil has been washed away, leaving the stones and gravel on the surface.



A stony pasture in Chemung County, N. Y.

Fallow plot on the Marcellus Soil Conservation Experiment Station, Marcellus, N. Y., showing stones and gravel left on the land through soil washing.



Surface Stones Sometimes Rest on a Pedestal of Soil

The pedestal may be a fraction of an inch or even several inches in height.

This condition clearly indicates that the sur-

rounding soil has been washed away.

It also shows that stones may help to prevent washing.



A flat stone resting on a pedestal of soil after a heavy rain, near North Lansing, Yates County, N. Y.

Stone removed.



Boulders and Bedrock Become Exposed on the Surface of the Soil, or Are Struck by the Plow Beneath the Surface

The presence of these boulders and bedrock may not have been evident a few years ago.

Boulders are often so large and reach so deep that heaving will not affect them.

Bedrock should not be affected en masse by heaving.

Erosion has lowered the surface of the soil until the boulders are exposed or come near the surface.



A limestone boulder protruding through the surface of the soil, in Centre County, Pa.

A flat sandstone exposed by erosion, in Somerset County, Pa.



The Plow May Strike Tile or Stone Ditches

The tractor or other heavy farm machinery may also break through them.

The tile and stone ditches were placed deep enough to be out of danger when they were first laid.

Each successive heavy rain washed a layer of soil off the surface of the land. In this way, soil erosion has lowered the soil level until these drainage systems are being damaged by farm and tillage machinery.



The tractor broke through this tile on a farm near Elton, Cambria County, Pa.

Erosion has reduced the surface soil over this stone ditch, on the Marcellus Experiment Station Farm, Marcellus, N. Y.



The Formation of Rills on Bare or Nearly Bare Land

Heavy rains often leave rills or "finger rills" several inches deep on sloping land. These are formed by runoff water.

Rills occur most often on freshly plowed or harrowed land, on grainfields when the grain is young, and on cultivated fields after the crop has been harvested.

Rills also occur on grassland where the sod is thin.

Because rills are easily erased by tillage, their presence may be forgotten.

Such periodic losses reduce the topsoil and fertility.



Rills on a newly sown grainfield in Centre County, Pa.

Severe rilling near Broadbrook, Conn.



Exposed Roots of Trees

Roots of trees do not ordinarily grow above ground.

Exposed roots indicate that the soil has been washed or blown away.

The amount of soil removed can be determined

by the change of color, texture, or other appearance of the bark on the trunk of the tree.

By the same signs the amount of soil removed may be determined though the roots are not yet exposed.



Roots of an apple tree exposed through soil washing, near Waynesboro, Pa.

Grazing the wood lot caused the erosion which exposed the roots of these maple trees in York County, Pa. (Below)



A Terrace Formed by Trees, Stumps, and Stone Piles, on Sloping Land

Washed soil will accumulate above a tree, stump, boulder, or stone pile, while it will move away on the lower side, forming an abrupt terrace.

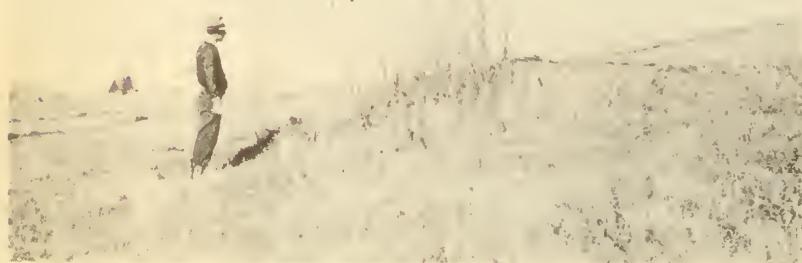
The topsoil may be quite deep above, while

very much reduced in depth or even completely gone below the obstacle.

Proper allowance must be made for the effects of tillage implements.



Washed soil piled above an apple tree on a hillside, in Somerset County, Pa.



An accumulation of soil above a stone pile on the experiment station farm, Marcellus, N. Y.



Soil accumulation above a tree in Anne Arundel County, Md.

Muddy Water

The muddy color of the water which runs from plowed or cultivated fields, or other exposed areas, during a heavy rain is due to the fine soil which is carried by the water.

During and after heavy rains, road ditches,

streams, and rivers run brown and red with their load of soil.

The layer of silt left in dried up puddles and depressions is proof that muddy water indicates erosion.



Muddy water running from a cornfield near Kingsville, Carroll County, Md.



Silt left on a field after muddy water had run off and evaporated on a farm in Ontario County, N. Y.



Bare Spots on Pasture

Fields too badly eroded for profitable cultivation or worth-while meadows are usually converted to permanent pasture.

Close grazing and the trampling of livestock

pave the way for further erosion by water and wind.

Until recent years little thought was given to the management and improvement of pasture.



"Galled spots" on a pasture in Onondaga County,
N. Y.

A "sand blow" in a pasture near Williston, Vt.



Accumulation of Soil Above Fences and Hedges

Stone fences and stone walls catch the most soil, and are sometimes banked to the top with soil washed from land above.

Rail fences, board fences, and wire fences stop washed soil; the lower rails, boards, or wires are

often buried in soil. Hedges also cause the water to drop much of its soil.

When fences and hedges running across the slope are removed, an abrupt terrace or bench several feet high is often revealed.



Washed soil banked to the top of a stone fence, on the Marcellus Experiment Station Farm, Marcellus, N. Y.

Washed soil being stopped by a hedge, on a farm in Ontario County, N. Y.



Unequal Depth of Topsoil on a Sloping Field, and on a Field that has a Rolling Topography

On upper slopes, ridges, and knobs, the topsoil may be largely washed or blown away, so that the color and quality of the surface soil is the same as that of the underlying subsoil.

On lower slopes and depressions there may be an

accumulation of topsoil, with a corresponding darker color.

The difference in depth can be measured in inches, and the variation in color is plainly visible at a distance.



Light-colored subsoil showing through eroded topsoil on land near Peach Bottom, Lancaster County, Pa.

Topsoil washed into the lower end of a field to a depth of 3 feet. Marcellus Experiment Station farm, Marcellus, N. Y.



Unequal Character of Vegetation

On knobs, ridges, and upper slopes, the crops and other vegetation are often of poorer quality than on lower levels.

The difference shows up in less vigor of growth,

lighter-colored leaves, shorter plants, and lower yields of crops.

Low fertility and lack of moisture are the cause, due to the thinness or absence of topsoil.



Tomatoes didn't do well on the eroded ridges in background of picture. Salem County, N. J.

Growth of field beans on eroded ridge is sparse as compared to that on deeper topsoil in foreground of picture. Montgomery County, N. Y.



A Decided Lowering of the Soil Level of a Field

When two fields lie side by side against a slope, with the dividing boundary running up and down the slope, it is quite common to find the soil level of one lower than the other.

The field which has been cultivated longer and has undergone more washing will be the lower.

The different levels are likely to be more notice-

able when a wood lot or "new land" lies on one side of the field boundary.

It is recognized that other factors may contribute slightly to this difference in elevation. Continual plowing toward the fence may raise the accumulation. The roots of luxuriant shrubs may raise it somewhat.



A pasture, near Somerset, Pa., which was formerly cultivated and was lowered through erosion.

A rotated field, near Johnstown, Pa., lowered through erosion.



Decline in Crop Yields

Declining crop yields have been largely attributed to loss of plant food through cropping. However, much of this lost fertility must be attributed to physical loss of soil through erosion.

Are crop yields declining more rapidly on sloping fields than on level land?

Are commercial fertilizers and soil-building practices necessary to maintain former yields on this land?

Are yields declining in spite of commercial fertilizers, better cultural methods, and improved seed, varieties, and strains?



Yields of potatoes vary with depth of topsoil, as shown by research at New Brunswick, N. J.

A badly eroded pasture near Spencer, W. Va., which would grow only broomsedge as shown on right of fence. After treatment with lime, fertilizer, and other soil-building measures the portion on left of fence again produced good pasture grasses.



Silting of Ponds and Water Holes

Rivers, harbors, and large reservoirs are filled up with soil but it may be difficult to trace the exact spot from which the soil came, because of the large size of the drainage area.

However, when farm ponds and water holes fill up it is quite evident that the soil came from near by. The fields immediately above have lost this soil.

Thirty years ago Phillip's mill pond, New Hope, Pa., provided water power for a gristmill.



Today this pond is completely filled with soil from the fields above.



The 8-foot rock dam still stands.



What To Do About It

Do you recognize conditions on your farm similar to any of those described here? If so, you have a soil-erosion problem, and of course you will want to do something about it.

Lower standards of living inevitably result from soil that is eroding and losing its fertility. Your family is entitled to the best the land can give. Then too, *you want to produce that extra food that will win the victory.*

You can't put the soil back on the field after it has washed or blown away, but you can prevent further soil washing and blowing. You can help nature create a new topsoil, and you can build up its fertility. A few suggestions:

Adjust the use of your land to its adaptability and the capability of the soil.

Keep steep and rough land under profitable vegetative cover, such as forest trees, wildlife cover, pasture, and long-time meadow.

Protect cultivated land with the following practices:

Use a suitable crop rotation.

Plow and plant on the contour.

Practice contour strip cropping.

Leave permanent sod strips in depressions and waterways.

Sow winter cover crops for winter and spring protection of the soil.

For further protection, you may need diversion ditches and broad-base terrace systems.

How To Get Assistance

If you live within a soil conservation district, get in touch with your supervisors or directors. They will be glad to send a trained man around to help you make a long-time plan for your farm, based upon the extent of erosion, the capability of each field, and the exact measures necessary to protect the land and build soil fertility. A soil conservation district offers this and many other benefits. One of the greatest benefits is complete cooperation between farmers.

If you live outside a soil conservation district, contact your State agricultural college or see your county agricultural agent who will either render the above service or put you in touch with any other agencies which are available in your territory.

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